

**PATENT APPLICATION**  
**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

In re application of

SESHIMO, Tatsuya, et al.

Divisional of  
Appln. No.: 09/324,720

Prior Group Art Unit: 2861

Confirmation No.: Unknown

Prior Examiner: D. Yockey

Filed: March 18, 2002

For: INK JET RECORDING APPARATUS AND RECORDING HEAD CLEANING  
CONTROL METHOD THEREOF

**PRELIMINARY AMENDMENT**

Commissioner for Patents  
Washington, D.C. 20231

Sir:

Prior to examination, please amend the above-identified application as follows:

**IN THE TITLE:**

**Please delete the present title and replace it with the following new title:**

**INK JET RECORDING APPARATUS AND RECORDING HEAD CLEANING  
CONTROL METHOD THEREON**

**IN THE SPECIFICATION:**

**Amend the specification by inserting, before the first line on page 1, the sentence:**

This is a divisional of Application No. 09/324,720 filed June 3, 1999, the disclosure of which is incorporated herein by reference, which is a C-I-P of Application No. 09/239,319 filed January 29, 1999, the disclosure of which is incorporated herein by reference.

**IN THE CLAIMS:**

**Please cancel claims 1-23 and 25-32 without prejudice or disclaimer.**

**Please enter the following amended claims:**

24. (Once amended) An ink jet recording apparatus comprising:

a ink jet recording head for discharging ink droplets through nozzle openings of said ink jet recording head upon receiving ink supply from an ink cartridge;

capping means for sealing said recording head to absorb ink through the nozzle openings;

a pump unit for applying negative pressure to said capping means;

a valve unit arranged between said ink cartridge and said nozzle openings of the recording head for opening and closing an ink supply path between the ink cartridge and the nozzle openings; and

valve opening/closing control means for controlling opening and closing of said valve unit,

wherein said valve opening/closing control means operates said valve unit to prevent ink from flowing from said ink cartridge to all of said nozzle openings at a first time,

wherein said capping means seals said recording head and said pump unit applies said negative pressure at a second time after said first time,

wherein said valve opening/closing control means operates said valve unit to allow ink to flow from said ink cartridge to said nozzle openings at a third time after said second time and while said capping means seals said recording heads,

wherein said valve opening/closing control means operates said valve unit to prevent ink from flowing from said ink cartridge to all of said nozzle openings at a fourth time after said third time, and

wherein said pump unit applies negative pressure to the capping means while said valve opening/closing control means opens an air valve supplying external air to said capping means at a fifth time after said fourth time and while ink is prevented from flowing to all of said nozzle openings.

33. (Once amended) A recording head cleaning method in an ink jet recording apparatus including an ink jet recording head for discharging ink droplets upon receiving ink supply from an ink cartridge, capping means for sealing said recording head to absorb ink through nozzle openings in said recording head, and a valve unit arranged between said ink cartridge and said nozzle openings of the recording head for opening and closing the ink supply path between the ink cartridge and the nozzle openings, the recording head cleaning method comprising:

(a) sealing the nozzle openings of the recording head with said capping means in a state closing said valve unit and applying negative pressure into the capping means;

(b) while applying said negative pressure into the capping means in said operation (a), opening said valve unit to absorb ink from selected nozzle openings of the nozzle openings of the recording head,

(c) after said operation (b), sealing the nozzle openings of the recording head with said capping means in said state closing said valve unit and applying negative pressure into the capping means, and

(d) while applying said negative pressure into the capping means in said operation (c), opening an air valve to supply external air to said capping means.

34. (Once amended) A recording head cleaning method as claimed in claim 33, wherein

said operation (d) prevents air bubbles formed with discharged ink within the capping means from being pulled into the nozzle openings of the recording head.

35. (Once amended) A recording head cleaning method in an ink jet recording apparatus including an ink jet recording head including nozzle openings for discharging different color ink droplets through said nozzle openings upon receiving ink from ink cartridges, capping means for sealing each nozzle opening of said recording head to absorb ink through the nozzle openings, and a plurality of valve units arranged between said ink cartridges and each nozzle opening of the recording head for opening and closing ink supply paths between the ink cartridges and the nozzle openings, the recording head cleaning method comprising:

(a) sealing the nozzle openings of the recording head with said capping means in a state closing said valve units and applying negative pressure into the capping means;

(b) while applying said negative pressure into the capping means in said operation (a), opening all or a part of said valve units to absorb ink through selected nozzle openings of the nozzle openings of the recording head,

(c) after said operation (b), sealing the nozzle openings of the recording head with said capping means in said state closing said valve units and applying negative pressure into the capping means, and

(d) while applying said negative pressure into the capping means in said operation (c), opening an air valve to supply external air to said capping means.


36. (Once amended) A recording head cleaning method as claimed in claim 35, wherein

said operation (d) prevents air bubbles formed with discharged ink within the capping means from being pulled into the nozzle openings of the recording head.

REMARKS

Entry and consideration of this Amendment are respectfully requested. Claims 1-23 and 25-32 have been canceled as they are the subject matter of related applications, so that claims 24 and 33-36 are all the claims pending in this application. Claims 24 and 33-36 were indicated as being allowable in parent application 09/324,720 and, therefore, should be in condition for immediate allowance. Such action is respectfully requested.

Respectfully submitted,

  
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APPENDIX

VERSION WITH MARKINGS TO SHOW CHANGES MADE

IN THE CLAIMS:

Claims 1-23 and 25-32 have been canceled without prejudice and/or disclaimer.

The claims have been amended as follows:

24. (Once amended) An ink jet recording apparatus comprising:

a ink jet recording head for discharging ink droplets through nozzle openings of said ink jet recording head upon receiving ink supply from an ink cartridge;

capping means for sealing said recording head to absorb ink [droplets] through the nozzle openings;

a pump unit for applying negative pressure to said capping means;

a valve unit arranged between said ink cartridge and said nozzle openings of the recording head for opening and closing an ink supply path between the ink cartridge and the nozzle openings; and

valve opening/closing control means for controlling opening and closing of said valve unit [in accordance with the cleaning operation to absorb ink droplets through of the nozzle openings, with sealing the nozzle openings of the recording head with said capping means],

wherein said valve opening/closing control means operates said valve unit to prevent ink from flowing from said ink cartridge to all of said nozzle openings at a first time,

wherein said capping means seals said recording head and said pump unit applies said negative pressure at a second time after said first time,

wherein said valve opening/closing control means operates said valve unit to allow ink to flow from said ink cartridge to said nozzle openings at a third time after said second time and while said capping means seals said recording heads,

wherein said valve opening/closing control means operates said valve unit to prevent ink from flowing from said ink cartridge to all of said nozzle openings at a fourth time after said third time, and

wherein said pump unit applies negative pressure to the capping means while said valve opening/closing control means opens an air valve supplying external air to said capping means at a fifth time after said fourth time and while ink is prevented from flowing to all of said nozzle openings.

33. (Once amended) A recording head cleaning method in an ink jet recording apparatus including [comprising:] an ink jet recording head for discharging ink droplets upon receiving ink supply from an ink cartridge[;], capping means for sealing said recording head to absorb ink [droplets] through nozzle openings in said recording head[;] and a valve unit arranged between said ink cartridge and said nozzle openings of the recording head for opening and closing the ink supply path between the ink cartridge and the nozzle openings, [and] the recording head cleaning method [in an ink jet recording] comprising [the steps of]:

(a) sealing the nozzle openings of the recording head with said capping means in a state closing said valve unit and applying negative pressure into the capping means;

(b) while [in said step, with] applying said negative pressure into the capping means in said operation (a), opening said valve unit to absorb ink from selected nozzle openings of the nozzle openings of the recording head,

(c) after said operation (b), sealing the nozzle openings of the recording head with said capping means in said state closing said valve unit and applying negative pressure into the capping means, and

(d) while applying said negative pressure into the capping means in said operation (c), opening an air valve to supply external air to said capping means.

34. (Once amended) A recording head cleaning method [in an ink jet recording apparatus] as claimed in claim 33, [executing the steps:] wherein

[closing the valve unit following said ink absorbing step,]  
[further closing the valve unit for preventing] said operation (d) prevents air bubbles formed with discharged ink within the capping means [in said ink absorbing step,] from being pulled into the nozzle openings of the recording head.

35. (Once amended) A recording head cleaning method in an ink jet recording apparatus including [comprising:] an ink jet recording head including nozzle openings for discharging different color ink droplets through [each] said nozzle [opening] openings upon receiving ink from [the] ink cartridges[;], capping means for sealing each nozzle opening of said recording head to absorb ink [droplets] through the nozzle openings[;], and a plurality of valve units arranged between said ink cartridges and each nozzle opening of the recording head for opening and closing [the] ink supply paths between the ink cartridges and [each] the nozzle openings, [and] the recording head cleaning method [in an ink jet recording apparatus] comprising [the steps of]:

(a) sealing the nozzle openings of the recording head with said capping means in a state closing said valve units and applying negative pressure into the capping means;

(b) while [in said step, with] applying said negative pressure into the capping means in said operation (a), opening [said] all or a part of said valve units to absorb ink through selected nozzle openings of the nozzle openings of the recording head,

(c) after said operation (b), sealing the nozzle openings of the recording head with said capping means in said state closing said valve units and applying negative pressure into the capping means, and

(d) while applying said negative pressure into the capping means in said operation (c), opening an air valve to supply external air to said capping means.

36. (Once amended) A recording head cleaning method [in an ink jet recording apparatus] as claimed in claim 35, [executing the steps:] wherein

[closing all valve units following said ink absorbing step, further closing valve units for preventing] said operation (d) prevents air bubbles formed with discharged ink within the capping means [in said ink absorbing step,] from being pulled into the nozzle openings of the recording head.